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=> d his

     (FILE 'HOME' ENTERED AT 15:32:39 ON 12 AUG 2002)

     FILE 'REGISTRY' ENTERED AT 15:32:47 ON 12 AUG 2002
L1             1 S 9014-52-2/RN

     FILE 'CAOLD, CAPLUS, CROPU, DGENE, DPCI, ENCOMPPAT, ENCOMPPAT2,
     EUROPATFULL, IFIPAT, INPADOC, JAPIO, PAPERCHEM2, PATDD, PATDPA, PATOSDE,
     PATOSEP, PATOSWO, PCTFULL, PIRA, RAPRA, SYNTHLINE, TULSA, TULSA2,
     USPATFULL, USPAT2, WPIDS' ENTERED AT 15:33:17 ON 12 AUG 2002

     FILE 'REGISTRY' ENTERED AT 15:33:23 ON 12 AUG 2002
                SET SMARTSELECT ON
L2           SEL L1 1- CHEM :       9 TERMS
                SET SMARTSELECT OFF

     FILE 'CAOLD, CAPLUS, CROPU, DGENE, DPCI, ENCOMPPAT, ENCOMPPAT2,
     EUROPATFULL, IFIPAT, INPADOC, JAPIO, PAPERCHEM2, PATDD, PATDPA, PATOSDE,
     PATOSEP, PATOSWO, PCTFULL, PIRA, RAPRA, SYNTHLINE, TULSA, TULSA2,
     USPATFULL, USPAT2, WPIDS' ENTERED AT 15:33:24 ON 12 AUG 2002
L3          2328 S L2
L4           125 S L3 AND HERBICID?
L5           121 DUP REM L4 (4 DUPLICATES REMOVED)
L6             9 S L5 AND PY<=1998
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=> d ibib ab 1

L6 ANSWER 1 OF 9 CAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:621327 CAPLUS
DOCUMENT NUMBER: 129:257866
TITLE: Maize Bx1 gene for an enzyme of benzoxazinone biosynthesis and its use in developing insect-, disease-, and **herbicide**-resistant plants
INVENTOR(S): Chomet, Paul; Frey, Monika; Gierl, Alfons
PATENT ASSIGNEE(S): Dekalb Genetics Corp., USA
SOURCE: PCT Int. Appl., 137 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
WO 9840505	A1	19980917	WO 1998-US5078	19980313	<--
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM					
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG					
AU 9864663	A1	19980929	AU 1998-64663	19980313	<--
US 6331660	B1	20011218	US 1998-39046	19980313	

PRIORITY APPLN. INFO.: US 1997-40513P P 19970313
WO 1998-US5078 W 19980313

AB The maize Bx1 gene involved in benzoxazinone biosynthesis is cloned and characterized. This gene is distinct from a previously described gene for a cytochrome P 450 mapping close to the Bx1. This gene, as well as other genes involved in benzoxazinone biosynthesis, provide valuable tools for the prodn. of transgenic plants with increased levels of benzoxazinone synthesis, and therefore, resistance to insect infestation, **herbicide** damage and disease. The gene was cloned by transposon tagging with Mu followed by AIMS (amplification of insertion mutagenized sites). The block in benzoxazinone biosynthesis arising from mutation in Bx1 could be alleviated by supplying indole, indicating a block in indole formation. The enzyme encoded by the Bx1 gene is demonstrated to be an indole synthase. The gene is expressed in young (5 day) roots and shoots.

=> d ibib ab 2

L6 ANSWER 2 OF 9 CAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1989:472994 CAPLUS
DOCUMENT NUMBER: 111:72994
TITLE: Screening of **tryptophan synthase** inhibitors as leads of **herbicide** candidates
AUTHOR(S): Shuto, Akira; Ohgai, Mayumi; Eto, Morifusa
CORPORATE SOURCE: Dep. Agric. Chem., Kyushu Univ., Fukuoka, 812, Japan
SOURCE: Nippon Noyaku Gakkaishi (**1989**), 14(1), 69-74
CODEN: NNGADV; ISSN: 0385-1559
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Of 53 heterocyclic compds. and 10 mercaptans tested, 4-(dimethylamino)- (I), 4-(diethylamino)-, and 4-(N-methyl-N-phenylamino)pyridines and 2-mercaptobenzimidazole (II) inhibited **tryptophan synthase** from Escherichia coli most strongly, with median inhibitory concns. of 0.067, 0.061, 0.072, and 0.045 mM, resp. I had no marked effect on whole plants, whereas II showed considerable postemergence phytotoxicity.

=> d ibib ab 3

L6 ANSWER 3 OF 9 CROPU COPYRIGHT 2002 THOMSON DERWENT
ACCESSION NUMBER: 1985-82411 CROPU F
TITLE: Enzymological Basis for Glyphosate Action in Candida maltosa.
AUTHOR: Bode R; Melo C; Birnbaum D
LOCATION: Greifswald, DDR
SOURCE: Biochem.Physiol.Pflanz. (179, No. 9, 775-83, 1984) 4 Fig. 2 Tab. 31 Ref.
CODEN: BPPFA4
AVAIL. OF DOC.: Ernst-Moritz-Arndt-Universitaet, Sektion Biologie, WB Molekularbiologfie, DDR-2200, Greifswald, D.D.R.
DOCUMENT TYPE: Journal
LANGUAGE: English
FIELD AVAIL.: AB; LA; CT
AB The enzymological basis for the inhibitory effect of glyphosate on growth of Candida maltosa was studied. The presence of glyphosate in the culture inhibited mainly 5-enolpyruvyl-shikimate 3-phosphate synthase (EC-2.5.1.19), but depressed many enzymes involved in amino acid biosynthesis. C. maltosa strain L4 was grown for 24 hr in minimal salt mediumwith 1 mg/l biotin, 10 mg/l glucose and 0-10 power -3 M glyphosate. Desalted crude extracts were assayed for 16 enzymes.

=> d ibib ab 4

L6 ANSWER 4 OF 9 USPATFULL
ACCESSION NUMBER: 1998:156918 USPATFULL
TITLE: Crosslinked protein crystals
INVENTOR(S): Navia, Manuel A., Lexington, MA, United States
St. Clair, Nancy L., Charlestown, MA, United States
PATENT ASSIGNEE(S): Vertex Pharmaceuticals, Inc., Cambridge, MA, United States (U.S. corporation)

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 5849296		19981215	<--
APPLICATION INFO.:	US 1995-476267		19950607	(8)

RELATED APPLN. INFO.: Continuation of Ser. No. US 1993-17510, filed on 12 Feb 1993, now patented, Pat. No. US 5618710 which is a continuation-in-part of Ser. No. US 1992-864424, filed on 6 Apr 1992, now abandoned which is a continuation-in-part of Ser. No. US 1991-720237, filed on 24 Jun 1991, now abandoned which is a continuation-in-part of Ser. No. US 1990-562280, filed on 3 Aug 1990, now abandoned
DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Naff, David M.
LEGAL REPRESENTATIVE: Fish & Neave, Haley, Jr., James F., Pierri, Margaret A.
NUMBER OF CLAIMS: 15
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 19 Drawing Figure(s); 19 Drawing Page(s)
LINE COUNT: 3122
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB A protein such as an enzyme or antibody is immobilized by crosslinking crystals of the protein with a multifunctional crosslinking agent. The crosslinked protein crystals may be lyophilized for storage. A preferred protein is an enzyme such as thermolysin, elastase, asparaginase, lysozyme, lipase or urease. Crosslinked enzyme crystals preferably retain at least 91% activity after incubation for three hours in the presence of a concentration of Pronase.TM. that causes the soluble uncrosslinked form of the enzyme to lose at least 94% of its initial activity under the same conditions. A preferred enzyme:Pronase.TM. ratio is 1:40. Enzyme crystals that are crosslinked may be microcrystals

having a cross-section of 10.sup.-1 mm or less. Crosslinked enzyme or antibody crystals may be used in an assay, diagnostic kit or biosensor for detecting an analyte, in an extracorporeal device for altering a component of a fluid, in producing a product such as using crosslinked thermolysin crystals to produce aspartame, in separating a substance from a mixture, and in therapy.

=> d ibib ab 5

L6 ANSWER 5 OF 9 USPATFULL

ACCESSION NUMBER:	97:36395 USPATFULL
TITLE:	Synthetic DNA sequence having enhanced insecticidal activity in maize
INVENTOR(S):	Koziel, Michael G., Cary, NC, United States Desai, Nalini M., Cary, NC, United States Lewis, Kelly S., Hillsborough, NC, United States Kramer, Vance C., Hillsborough, NC, United States Warren, Gregory W., Cary, NC, United States Evola, Stephen V., Apex, NC, United States Crossland, Lyle D., Chapel Hill, NC, United States Wright, Martha S., Cary, NC, United States Merlin, Ellis J., Raleigh, NC, United States Launis, Karen L., Franklinton, NC, United States Rothstein, Steven J., Guelph, Canada Bowman, Cindy G., Cary, NC, United States Dawson, John L., Chapel Hill, NC, United States Dunder, Erik M., Chapel Hill, NC, United States Pace, Gary M., Cary, NC, United States Suttie, Janet L., Raleigh, NC, United States
PATENT ASSIGNEE(S):	Ciba-Geigy Corporation, Tarrytown, NY, United States (U.S. corporation)

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 5625136		19970429	<--
APPLICATION INFO.:	US 1992-951715		19920925 (7)	
RELATED APPLN. INFO.:	Continuation-in-part of Ser. No. US 1991-772027, filed on 4 Oct 1991, now abandoned			
DOCUMENT TYPE:	Utility			
FILE SEGMENT:	Granted			
PRIMARY EXAMINER:	Fox, David T.			
ASSISTANT EXAMINER:	McElwain, Elizabeth			
LEGAL REPRESENTATIVE:	Walsh, Andrea C.			
NUMBER OF CLAIMS:	25			
EXEMPLARY CLAIM:	1,6			
NUMBER OF DRAWINGS:	90 Drawing Figure(s); 90 Drawing Page(s)			
LINE COUNT:	4537			

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB DNA sequences optimized for expression in plants are disclosed. The DNA sequences preferably encode for an insecticidal polypeptides, particularly insecticidal proteins from Bacillus thuringiensis. Plant promoters, particular tissue-specific and tissue-preferred promoters are also provided. Additionally disclosed are transformation vectors comprising said DNA sequences. The transformation vectors demonstrate high levels of insecticidal activity when transformed into maize.

=> d ibib ab 6

L6 ANSWER 6 OF 9 USPATFULL

ACCESSION NUMBER:	97:29369 USPATFULL
TITLE:	Crosslinked enzyme crystals
INVENTOR(S):	Navia, Manuel A., Lexington, MA, United States St. Clair, Nancy L., Charlestown, MA, United States
PATENT ASSIGNEE(S):	Vertex Pharmaceuticals, Inc., Cambridge, MA, United States (U.S. corporation)

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 5618710		19970408	<--
APPLICATION INFO.:	US 1993-17510		19930212	(8)

RELATED APPLN. INFO.: Continuation-in-part of Ser. No. US 1992-864424, filed on 6 Apr 1992, now abandoned which is a continuation-in-part of Ser. No. US 1991-720237, filed on 24 Jun 1991, now abandoned which is a continuation-in-part of Ser. No. US 1990-562280, filed on 3 Aug 1990, now abandoned

DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Naff, David M.
LEGAL REPRESENTATIVE: Fish & Neave, Haley, Jr., James F., Pierri, Margaret A.
NUMBER OF CLAIMS: 13
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 19 Drawing Figure(s); 19 Drawing Page(s)
LINE COUNT: 3106
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A protein such as an enzyme of antibody is immobilized by crosslinking crystals of the protein with a multifunctional crosslinking agent. The crosslinked protein crystals may be lyophilized for storage. A preferred protein is an enzyme such as thermolysin, elastase, asparaginase, lysozyme, lipase or urease. Crosslinked enzyme crystals preferably retain at least 91% activity after incubation for three hours in the presence of a concentration of Pronase.TM. that causes the soluble uncrosslinked form of the enzyme to lose at least 94% of its initial activity under the same conditions. A preferred enzyme:Pronase.TM. ratio is 1:40. Enzyme crystals that are crosslinked may be microcrystals having a cross-section of 10.sup.-1 mm or less. Crosslinked enzyme or antibody crystals may be used in an assay, diagnostic kit or biosensor for detecting an analyte, in an extracorporeal device for altering a component of a fluid, in producing a product such as using crosslinked thermolysin crystals to produce aspartame, in separating a substance from a mixture, and in therapy.

=> d ibib ab 7

L6 ANSWER 7 OF 9 USPATFULL
ACCESSION NUMBER: 94:3681 USPATFULL
TITLE: Transformation of plants to introduce closely linked markers
INVENTOR(S): Jorgensen, Richard A., Berkeley, CA, United States
PATENT ASSIGNEE(S): DNA Plant Technology Corporation, Oakland, CA, United States (U.S. corporation)

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 5278057		19940111	<--
APPLICATION INFO.:	US 1992-926249		19920806	(7)

DISCLAIMER DATE: 20100119
RELATED APPLN. INFO.: Continuation of Ser. No. US 1985-723857, filed on 16 Apr 1985, now patented, Pat. No. US 5180873
DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Fox, David T.
LEGAL REPRESENTATIVE: Neagley, Clinton H.
NUMBER OF CLAIMS: 14
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 4 Drawing Figure(s); 4 Drawing Page(s)
LINE COUNT: 1620
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A novel method of producing a plant with a marker closely linked to a target locus, in particular a nuclear male sterile target locus, is described. The method involves transformation of a group of plants in

order to introduce a marker into each plant, and isolation of a plant with the marker closely linked to a target locus. The markers include visible markers and dominant conditional lethal markers. The method is of particular use for hybrid seed production where the target locus is a nuclear male sterile locus.

=> d ibib ab 8

L6 ANSWER 8 OF 9 USPATFULL
ACCESSION NUMBER: 93:12431 USPATFULL
TITLE: Method for the selective control of weeds, pests, and microbes
INVENTOR(S): Fischer, Randy S., 3746 NW. 7th Ave., Gainesville, FL, United States 32607
Jensen, Roy A., P.O. Box 1460, Melrose, FL, United States 32666

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 5187071		19930216	<--
APPLICATION INFO.:	US 1988-219959		19880715 (7)	

DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Rosen, Sam
LEGAL REPRESENTATIVE: Saliwanchik & Saliwanchik
NUMBER OF CLAIMS: 11
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 1 Drawing Figure(s); 1 Drawing Page(s)
LINE COUNT: 857
AB A novel means for identifying selective control agents for weeds, pests, and microbes is provided. Novel compositions for the selective control of weeds, pests, and microbes are also provided. The critical elements in the novel method of the invention relate to the systematic and specific identification of points of diversity which exist between the target organism and the host or other non-target organisms. More specifically the process involves identifying a difference which exists between the metabolic pathway of a microbial or plant target organism and a non-target host specie and then preparing a control agent which perturbs the metabolic pathway of the target without significantly perturbing the metabolic pathway of the host.

=> d ibib ab 9

L6 ANSWER 9 OF 9 USPATFULL
ACCESSION NUMBER: 93:5533 USPATFULL
TITLE: Transformation of plants to introduce closely linked markers
INVENTOR(S): Jorgensen, Richard A., Berkeley, CA, United States
PATENT ASSIGNEE(S): DNA Plant Technology Corporation, Oakland, CA, United States (U.S. corporation)

	NUMBER	KIND	DATE	
PATENT INFORMATION:	US 5180873		19930119	<--
APPLICATION INFO.:	US 1985-723857		19850416 (6)	

DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Fox, David T.
LEGAL REPRESENTATIVE: Neagley, Clinton H.
NUMBER OF CLAIMS: 40
EXEMPLARY CLAIM: 39
NUMBER OF DRAWINGS: 4 Drawing Figure(s); 4 Drawing Page(s)
LINE COUNT: 1739
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB A novel method of producing a plant with a marker closely linked to a

target locus, in particular a nuclear male sterile target locus, is described. The method involves transformation of a group of plants in order to introduce a marker into each plant, and isolation of a plant with the marker closely linked to a target locus. The markers include visible markers and dominant conditional lethal markers. The method is of particular use for hybrid seed production where the target locus is a nuclear male sterile locus.

L2 ANSWER 1 OF 1 REGISTRY COPYRIGHT 2001 ACS
RN **9014-52-2** REGISTRY
CN Synthase, tryptophan (9CI) (CA INDEX NAME)
OTHER NAMES:
CN E.C. 4.1.2.8
CN E.C. 4.2.1.20
CN Indoleglycerol phosphate aldolase
CN L-Tryptophan synthetase
CN Tryptophan desmolase
CN Tryptophan synthase
CN Tryptophan synthetase
DR 9024-50-4
MF Unspecified
CI MAN
LC STN Files: AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CAPLUS, CASREACT, CHEMINFORMRX, CIN, EMBASE, PROMT, TOXLIT, USPATFULL

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
984 REFERENCES IN FILE CA (1967 TO DATE)
21 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
985 REFERENCES IN FILE CAPLUS (1967 TO DATE)

Complete Entry of EC-Number 4.2.1.20

<_>:= reference; #_#:=organism

EC NUMBER
4.2.1.20

ORGANISM
#1# Salmonella typhimurium <2,3,20-22,29,33>
#2# E. coli <2-6,11,12,15,20,23,27,28,30-32,34,35>
#3# Saccharomyces cerevisiae <2,7,8,13>
#4# Brevibacterium lactofermentum <2>
#5# Bacillus subtilis <2,16,17>
#6# Caulobacter crescentus <2>
#7# Klebsiella aerogenes <2>
#8# Lactobacillus casei <2>
#9# Pseudomonas aeruginosa <2>
#10# Serratia marcescens <2,9>
#11# Proteus mirabilis <2,10>
#12# Neurospora crassa <1,2,14,18>
#13# Pisum sativum <19>
#14# Vibrio parahemolyticus <2>
#15# Agrobacterium tumefaciens <24>
#16# Arabidopsis thaliana <25,26>
#17# Anabaena variabilis <36>
#18# Chlorella ellipsoidea <36>

SYSTEMATIC NAME
L-serine hydro-lyase (adding indoleglycerol-phosphate)

RECOMMENDED NAME
tryptophan synthase

SYNONYMS
synthase, tryptophan
tryptophan desmolase
L-tryptophan synthetase
indoleglycerol phosphate aldolase
tryptophan synthetase

CAS REGISTRY NUMBER
9014-52-2

REACTION
L-serine + 1-(indol-3-yl)glycerol 3-phosphate = L-tryptophan + glyceraldehyde 3-phosphate + H2O (mechanism, #1,2# <20>)

REACTION TYPE
addition (of H2O)
elimination (of H2O, of NH3, C-O bond cleavage)
replacement (beta-position of amino acid)

SUBSTRATES/PRODUCTS
S 1. 2-mercaptoethanol + L-serine + pyridoxal phosphate #1,2# <3>
P 1. S-pyruvylmercaptoethanol + pyridoxamine phosphate + H2O #1,2# <3>
S 2. L-tryptophan + D-glyceraldehyde 3-phosphate + H2O #3# (#3#, r <8>) <8>

P 2. indole-3-glycerol phosphate + L-serine #3# (#3#, r <8>) <8>
S 3. 2-amino-3-butenoic acid #1,2# (vinylglycine) <3>
P 3. 2-oxobutyric acid + NH3 #1,2# <3>
S 4. indole + D-glyceraldehyde 3-phosphate #1-3,13# (#1-3,13#, r <8,19,20>) <8,19,20>
P 4. indole-3-glycerol phosphate #1-3,13# (#1-3,13#, r <8,19,20>) <8,19,20>
S 5. 1-(indol-3-yl)glycerol 3-phosphate + L-serine #1,2,3,11,12,13# (#3# r <8>; #1,2,11# catalyzed by alpha2beta2 holoenzyme <3,10>; #11#, hybrid enzyme with beta2 subunit of E. coli or Salmonella typhimurium active in this reaction <10>; #11#, hybrid enzyme with alpha subunit of E. coli or Salmonella typhimurium active in this reaction <10>) <1,3,6-8,10,19-23>
P 5. L-tryptophan + D-glyceraldehyde 3-phosphate + H2O #1,2,3,12# <1,3,8>
S 6. indole-3-glycerol phosphate #1-3,5,11-13# (#1-3,13#, r <8,19,20>; #1,2,5,11# catalyzed by alpha-subunit <3,10,16>; #11#, hybrid enzyme with beta2 subunit of E. coli or Salmonella typhimurium active in this reaction <10>; #1#, mechanism <20>) <1,3,8,10,12,13,16,19-23>
P 6. indole + D-glyceraldehyde 3-phosphate #1-3,5,12,13# (#1-3,13#, r <8,19,20>) <1,3,8,12,16,19,20>
S 7. indole + L-serine #1,2,3,5,10-13# (#1,2,5,11#, catalyzed by beta2 subunit <3,11,17>; #1,2#, OH of Ser can be replaced by SCH3, OCH3 and Cl, but not by indole, indole can be replaced by CH3SH, CH2OHCH2SH, thiobenzyl alcohol, 1-propanethiol, 1-butanethiol, selenols, 6-azidoindole <3>; #11#, hybrid enzyme with alpha subunit of E. coli or Salmonella typhimurium shows low activity in this reaction <10>; #11#, hybrid enzyme with beta2 subunit of E. coli or Salmonella typhimurium inactive in this reaction <10>) <1,3,8,9,10,11,12,13,15,17-23,27,29,33>
P 7. L-tryptophan + H2O #2,3,5,10,12# <1,8,9,15,17,27>
S 8. L-serine #1,2# (#1,2#, catalyzed by beta2-subunit <3>; #1,2#, OH of Ser can be replaced by SCH3, OCH3 and Cl, but not by indole <3>) <3,22,27>
P 8. pyruvate + NH3 #1,2# <3,22,27>

TURNOVER NUMBER [1/min]
326.4 #1# {indole} (cosubstrate L-Ser, presence of 20 mM Cs+, #1#) <29>
324 #1# {indole} (cosubstrate L-Ser, #1#) <22>
324 #1# {L-Ser} (cosubstrate indole, #1#) <22>
291 #1# {indole} (cosubstrate L-Ser, presence of 20 mM K+, #1#) <29>
256.2 #1# {indole} (cosubstrate L-Ser, presence of 20 mM Li+, #1#) <29>
222 #1# {1-(indol-3-yl)glycerol 3-phosphate} (reaction of alpha2beta2 complex, #1#) <22>
204.6 #1# {indole} (cosubstrate L-Ser, presence of 20 mM Na+, #1#) <29>
158.4 #1# {indole} (cosubstrate L-Ser #1#) <29>
16.8 #1# {1-(indol-3-yl)glycerol 3-phosphate} (reaction of alpha subunit, #1#) <22>
3.6 #1# {serine} (serine deaminase reaction, #1#) <22>

SPECIFIC ACTIVITY [µmol/min/mg]
275 #2# (#2#, indole + L-Ser) <12>
125 #1,2# (#1,2#, indole-3-glycerol phosphate + L-serine) <3>
85 #2# (#2#, indole + L-Ser) <11>
10.53 #13# <19>
8.05 #10# <9>
2.8 #5# (#5#, indole production from 1-(indol-3-yl)glycerol 3-phosphate) <16>
1.69 #3# <7>
0.608 #2# <15>

KM VALUE [mM]
5.7 #13# {L-Ser} (cosubstrate indole, #13#) <19>
5.3 #3# {L-Ser} (cosubstrate indole, #3#) <13>
1.1 #3# {D-glyceraldehyde 3-phosphate} (cosubstrate L-Trp, i.e. reverse reaction, #3# <8>) <8>
0.6 #1# {L-Ser} (cosubstrate indole, #1#) <22>
0.59 #1# {indole} (cosubstrate L-Ser #1#) <29>
0.5 #3# {1-(indol-3-yl)glycerol 3-phosphate} (no cosubstrate, #3#) <13>
0.17 #3# {indole} (cosubstrate D-glyceraldehyde 3-phosphate, #3# <8>) <8>
0.16 #3# {indole} (cosubstrate L-Ser, #3# <13>) <13>
0.095 #1# {indole} (cosubstrate L-Ser, presence of 20 mM K+, #1#) <29>
0.07 #3# {1-(indol-3-yl)glycerol 3-phosphate} (cosubstrate L-Ser, #3#) <13>
0.07 #3# {indole} (cosubstrate L-Ser, #3# <8>) <8>
0.067 #1# {indole} (cosubstrate L-Ser, presence of 20 mM Cs+, #1#) <29>
0.06 #1# {indole} (cosubstrate L-Ser, #1#) <22>
0.05 #13# {indole} (cosubstrate L-Ser, #13#) <19>
0.044 #1# {indole} (cosubstrate L-Ser, presence of 20 mM Li+, #1#) <29>
0.04 #1# {1-(indol-3-yl)glycerol 3-phosphate} (reaction of alpha subunit, #1#) <22>

0.032 #3# {1-(indol-3-yl)glycerol 3-phosphate} (cosubstrate L-Ser, #3#) <7>
0.02 #1# {serine} (serine deaminase reaction, #1#) <22>
0.018 #1# {indole} (cosubstrate L-Ser, presence of 20 mM Na+, #1#) <29>
0.013 #13# {1-(indol-3-yl)glycerol 3-phosphate} (#13#) <19>
0.011 #3# {indole} (cosubstrate L-Ser, #3#) <7>
0.01 #1# {1-(indol-3-yl)glycerol 3-phosphate} (reaction of alpha2beta2 complex, #1#) <22>

PH OPTIMUM
9 #2# <15>
7.8-8 #5# (#5#, beta2 subunit) <17>
7.6 #13# (#13#, optimum for the reactions: 1. indole-3-glycerol phosphate + L-Ser, 2. indole + L-Ser) <19>
7.2 #3# <8>
6.9-7 #3# <13>

PH RANGE
6-8 #5# (alpha-subunit) <16>

COFACTORS, PROSTHETIC GROUPS, ACTIVATING SUBSTANCES
- hydroxylamine #5# (#5#, 0.4-1.2 M, 7fold stimulation of alpha subunit) <16>
- Pyridoxal 5'-phosphate #1,2,3,10,12# (#1# 0.2-0.5 mol bound per subunit <1>; #1,2# 2 mol bound per mol of beta2 subunit <3>; Km: 0.18 mM <8>; #1#, Km: 0.009 mM <9>; #1#, forms a Schiff base with the epsilon amino-group of Lys87 <20>; #2#, spectroscopic properties <27>) <1,3,8,9,18,20,27>

METALS, IONS
- K+ #5# (#5#, stimulation, Km: 140 mM) <17>

INHIBITORS
- 5,5'-Dithiobis(2-nitrobenzoate) #3# <13>
- 6-azido-L-tryptophan #1,2# <3>
- GSH #3# <13>
- indoleacetic acid #3# (#3# 3.5 mM, 50% inhibition) <13>
- indoleacrylic acid #3# (#3# 0.05 mM, 50% inhibition) <13>
- indolebutanol phosphate #2# (#2#, competitive in the catalysis of indoleglycerol phosphate cleavage, Ki: 0.0011 mM <12>) <12>
- indolebutyric acid #3# (#3# 7.5 mM, 50% inhibition) <13>
- indoleethanol phosphate #2# (#2#, competitive in the catalysis of indoleglycerol phosphate cleavage, Ki: 0.05 mM <12>) <12>
- indolepropanol phosphate #2# (#2#, competitive in the catalysis of indoleglycerol phosphate cleavage, Ki: 0.004 mM <12>) <12>
- indolepropionic acid #3# (#3# 7.5 mM, 50% inhibition) <13>
- indolepyruvic acid #3# (#3# 2.3 mM, 50% inhibition) <13>
- L-cysteine #3# <13>
- PCMB #3# <13>
- protamine sulfate #12# <18>
- trans-L-2-amino-4-methoxy-3-butenoic acid #1,2# <3>

SOURCE/TISSUE
buds #13# (terminal, of young plants) <19>
leaf #16# <25>
seedling #13# (#13#, activity highest in shoot tips, less activity in young leaves and internodes, activity declines with maturation) <19>

LOCALIZATION
- chloroplast #16# <26>

PURIFICATION
- #1# (alpha2beta2 holoenzyme, beta2 holoenzyme, beta2 apoenzyme, alpha subunit <3>; alpha subunit <33>; beta subunit <33>) <3,33>
- #10# (B subunit) <9>
- #11# (alpha2,beta2 complex and dissociation into its subunits) <10>
- #12# (mutant enzyme <18>) <14,18>
- #13# (partial) <19>
- #15# <24>

· #2# (alpha2beta2 holoenzyme, beta2 holoenzyme, beta2 apoenzyme, alpha subunit <3>; beta2 subunit <11>; alpha subunit <12>) <3,11,12,15>
· #3# <7,8,13>
· #5# (alpha subunit <16>; beta2 subunit <17>) <16,17>

CRYSTALLIZATION
· #1# (structure and function of alpha subunit, beta subunit, alpha2beta2 complex <20>; crystal structure <21>) <20-22>

MOLECULAR WEIGHT
· 153000 #3# (#3#, sedimentation equilibrium centrifugation <8>) <8>

SUBUNITS
· ? #5,10,12,15# (#10#, 89000, B2 subunit, polyacrylamide gel electrophoresis, 2 * 43000, B subunit, SDS-PAGE <9>; #12# 74000, SDS-PAGE <14>; #5#, x * 25600-26300, alpha subunit, ultracentrifugation, SDS-PAGE <16>; #5#, 2 * 39700-41000, beta subunit, 1 * 82000, beta2 subunit, ultracentrifugation, SDS-PAGE <17>; #15#, x * 33000 (alpha) + x * 51000 (beta), SDS-PAGE <24>; #16#, alpha subunit, x * 28800, calculation from amino acid sequence, x * 31000, SDS-PAGE <26>) <9,14,16,17,24,26>
· Dimer #3# (#3#, 2 * 74000, SDS-PAGE <7>; #3#, 2 * 77000, sedimentation equilibrium in 6 M guanidine hydrochloride <8>) <7,8>
· Additional information: #1-9,14# (#1-9,14#, sequence alignment of alpha-subunit <2>; #1,2#, activities of alpha and beta subunits are coordinated by allosteric interactions <20>; #2#, kinetics of assembly of subunits <23>) <2,20,23>

CLONED
· #1# (expression in E. coli) <33>
· #16# (isolation of alpha subunit mutants <25>; glutathione S-transferase fusion protein with alpha and beta subunits <26>) <25>
· #2# (alpha-subunit <5>) <5>

PH STABILITY .
6-7.5 #3# <13>

TEMPERATURE STABILITY [°C]
67 #12# (#12#, 10 min, rapid inactivation) <18>
65 #12# (#12#, 10 min, no loss of activity) <18>
37 #2# (#2#, 30 min, 20% loss of activity) <15>
Additional information: #1,2,15# (#2#, effect of amino acid substitution at E49 of alpha-subunit on stability <4>; #1,2# denaturation temperatures of alpha subunit <20>; #2# pyridoxal 5'-phosphate stabilizes against thermal inactivation, Schiff-base forming amino acids destabilize holo beta subunit <20>; #1#, ligands that promote subunit association (L-Ser, L-Trp, D-Trp) raise the inactivation temperature of alpha subunit <20>; #15#, thermolabile inhibiting factor can be inactivated by heating to 60 C <24>) <4,20,24>

GENERAL STABILITY
· #5# glycerol 15% v/v stablizes beta2 subunit <17>
· #3# influence of ionic strength, stable in 1 M phosphate buffer, instable in 0.1M or 0.01 M phosphate buffer <13>
· #2# pyridoxal 5'-phosphate strongly stabilizes beta2 subunit <20>

STORAGE STABILITY
· #3# -18°C <8>
· #1# -20°C, beta subunit, 50 mM sodium bicine buffer, pH 7.8, 1 mM EDTA, 0.04 mM pyridoxal 5'-phoshate, 2 mM DTT <33>
· #5# -20°C, beta2-subunit, potassium phosphate buffer pH 6.5-6.6, EDTA, 2-mercaptoethanol, pyridoxal 5'-phosphate <17>
· #3# -20°C, frozen solution or suspension in 50% saturated ammonium sulfate, 40% residual activity after 3 years <7>
· #15# -20°C, lyophilized, several months stable <24>
· #1# -75°C, or liquid N2, alpha subunit <33>
· #2# 0°C, in cellulose triacetate, 6 months <15>
· #3# 4°C, 1 M potassium phosphate buffer, pH 7.6, 1 mM pyridoxal 5'-phosphate, 2 mM PMSF, 24 h, 7% loss of activity <13>

RENATURED
· #2# <35>

ENGINEERING

· C170F #2# (beta subunit, indole is channelled from the alpha site to the beta site in the physiologically relevant alphabeta reaction) <31>
· D60Y #1# (mutation inhibits the ligand-induced transition of the alpha subunit from an open to a closed conformation that serves to block the tunnel for the metabolite chanelling) <20>
· E109A #1# (catalytic activity with beta-chloro-L-Ala, but negligible activity with L-Ser, beta subunit) <20>
· E109D #1# (catalytic activity with beta-chloro-L-Ala, but reduced activity with L-Ser, beta subunit) <20>
· E49F #1# (mutation inhibits the ligand-induced transition of the alpha subunit from an open to a closed conformation that serves to block the tunnel for the metabolite chanelling) <20>
· E49X #2# (effect of amino acid substitution at E49 of alpha-subunit on stability) <4>
· F139W #2# (replacement of Phe with Trp does not alter the stability to urea <28>; kinetics of unfolding of alpha subunit <30>) <28,30>
· F258W #2# (replacement of Phe with Trp does not alter the stability to urea <28>; kinetics of unfolding of alpha subunit <30>) <28,30>
· G281R #2# (beta2 subunit, shift of pH-optimum from 7.5 to 9.8, mutant stimulated by NH4+) <32>
· G281R #2# (reduced activity and weak association with alpha subunit) <20>
· G51L #1# (mutation inhibits the ligand-induced transition of the alpha subunit from an open to a closed conformation that serves to block the tunnel for the metabolite chanelling) <20>
· K87T #1# (Lys87 represents an essential catalytic residue as acceptor of the alpha-proton of L-Ser, alpha subunit) <20>
· Additional information: #2# (enzymatic properties of 93 mutants of the alpha subunit) <34>
· P132A #2# (increase of activity of the alpha2beta2 complex) <20>
· P132G #2# (increase of activity of the alpha2beta2 complex) <20>
· P57A #2# (increase of activity of the alpha2beta2 complex) <20>
· R179L #1# (mutation inhibits the ligand-induced transition of the alpha subunit from an open to a closed conformation that serves to block the tunnel for the metabolite chanelling) <20>

LINKS TO OTHER DATABASES
SWISSPROT
KEGG

REFERENCES

1 Pratt, M.L.; DeMoss, J.A.: Neurospora tryptophan synthase. Characterization of the pyridoxal phosphate binding site:: J. Biol. Chem., 263; 6872-6876 (1988) (c)
2 Crawford, I.P.; Niermann, T.; Kirschner, K.: Prediction of secondary structure by evolutionary comparison: application to the alpha-subunit of tryptophan synthase:: Proteins Struct. Funct. Genet., 2; 118-129 (1987) (c)
3 Miles, E.W.; Bauerle, R.; Ahmed S.A.: Tryptophan synthase from Escherichia coli and Salmonella thyphimurium:: Methods Enzymol., 142; 398-414 (1987) (c,review)
4 Yutani, K.; Ogasahara, K.; Tsujita, T.; Sugino, Y.: Dependence of conformational stability on hydrophobicity of the amino acid residue in a series of variant proteins substituted at a unique position of tryptophan synthase alpha subunit:: Proc. Natl. Acad. Sci. USA, 84; 4441-4444 (1987) (c)
5 Milton, D.L.; Napier, M.L.; Myers, R.M.; Hardman, J.K.: In vitro mutagensis and overexpression of the Escherichia coli trpA gene and the partial characterization of the resultant tryptophan synthase mutant alpha-subunits:: J. Biol. Chem., 261; 16604-16615 (1986) (c)
6 Drewe, W.F.; Dunn, M.F.: Characterization of the reaction of L-serine and indole with Escherichia coli tryptophan synthase via rapid-scanning ultraviolet-visible spectroscopy:: Biochemistry, 25; 2494-2501 (1986) (c)
7 Bailey, C.J.; Turner, P.D.: Purification and properties of tryptophan synthase from baker's yeast (Saccharomyces cerevisiae):: Biochem. J., 209; 151-157 (1983) (c)
8 Bartholmes, P.; Boeker, H.; Jaenicke, R.: Purification of tryptophan synthase from Saccharomyces cerevisiae and partial activity of its nicked subunits:: Eur. J. Biochem., 102; 167-172 (1979) (c)
9 Rocha, V.; Brennan, E.F.: Purification and partial characterization of the B subunit of Serratia marcescens tryptophan synthetase:: J. Bacteriol., 134; 950-957 (1978) (c)
10 Riverin, M.; Drapeau, G.R.: Purification and properties of the alpha2beta2 complex of tryptophan synthetase of Proteus mirabilis:: J. Biol. Chem., 251; 3875-3880 (1976) (c)
11 Shannon, L.M.; Mills, S.E.: Purification and immunoadsorbtion chromatography of the normal and a mutant form of the B2 subunit of Escherichia coli tryptophan synthase:: Eur. J. Biochem., 63; 563-568 (1976) (c)
12 Kirschner, K.; Wiskocil, R.L.; Foehn, M.; Rezeau, L.: The tryptophan synthase from Escherichia coli. An improved purification procedure for the alpha-subunit and binding studies with substrate analogues:: Eur. J. Biochem., 60; 513-523 (1975) (c)
13 Wolf, D.H.; Hoffmann, M.: Tryptophan synthase from yeast. Purification by affinity chromatography, physical properties:: Eur. J. Biochem., 45; 269-276 (1974) (c)
14 Owens, D.; Bailey, C.J.: The purification and structure of tryptohan synthetase from Neurospora crassa:: Biochem. Soc. Trans., 2; 1331-1332 (1974) (c)
15 Zaffaroni, P.; Vitobello, V.; Cecere, F.; Giacomozzi, E.; Morisi, F.: Synthesis of L-tryptophan from indole and DL-

serine by tryptophan synthetase entrapped in fibres 1. Preparation and properties of free and entrapped enzyme:: Agric. Biol. Chem., 38; 1335-1342 (1974) (c)
16 O'Neil Hoch, S.: Tryptophan synthetase from Bacillus subtilis, purification and characterization of the alpha component:: J. Biol. Chem., 248; 2999-3003 (1973) (c)
17 O'Neil Hoch, S.: Tryptophan synthetase from Bacillus subtilis. Purification and characterization of the beta2 component:: J. Biol. Chem., 248; 2992-2998 (1973) (c)
18 Tsai, H.; Suskind, S.R.: Enzymatic properties of a mutant tryptophan synthase from Neurospora crassa:: Biochim. Biophys. Acta, 284; 324-340 (1972) (c)
19 Nagao, R.T.; Moore, T.C.: Partial purification and properties of tryptophan synthase of pea plants:: Arch. Biochem. Biophys., 149; 402-443 (1972) (c)
20 Miles, E.W.: Tryptophan synthase, structure, function, and protein engineering:: Subcell. Biochem., 24; 207-254 (1995) (c,review)
21 Hyde, C.C.; Ahmed, S.A.; Padlan, E.A.; Miles, E.W.; Davies, D.R.: Three-dimensional structure of the tryptophan synthase alpha2beta2 multienzyme complex from Salmonella typhimurium:: J. Biol. Chem., 263; 17857-17871 (1988) (c)
22 Ahmed, S.A.; Hyde, C.C.; Thomas, G.; Miles, E.W.: Microcrystals of tryptophan synthase alpha2beta2 complex from Salmonella typhimurium are catalytically active:: Biochemistry, 26; 5492-5498 (1987) (c)
23 Lane, A.N.; Paul, C.H.; Kirschner, K.: The mechanism of self-assembly of the multi-enzyme complex tryptophan synthase from Escherichia coli:: EMBO J., 3; 279-287 (1984) (c)
24 Rekoslavskava, N.I.; Kuznetsova, E.V.; Vysotskaya, E.F.; Salyaec, R.K.: Tryptophan synthase from Agrobacterium tumefaciens 8628: isolation and properties:: Biokhimiya, 62; 433-439 (1997) (c)
25 Radwanski, E.R.; Barczak, A.J.; Last, R.L.: Characterization of tryptophan synthase alpha subunit mutants of Arabidopsis thaliana:: Mol. Gen. Genet., 253; 353-361 (1996) (c)
26 Zhoa, J.; Last, R.L.: Immunological characterization and chloroplast localization of the tryptophan biosynthetic enzymes of the flowering plant Arabidopsis thaliana:: J. Biol. Chem., 270; 6081-6087 (1995) (c)
27 Ahmed, S.A.; McPhie, P.; Miles, E.W.: A thermally induced reversible conformational transition of the tryptophan synthase beta2 subunit probed by the spectroscopic properties of pyridoxal phosphate and by enzymatic activity:: J. Biol. Chem., 271; 8612-8617 (1996) (c)
28 Choi, S.-G.; O'Donnell, S.E.; Sarken, K.D.; Hardmann, J.K.: Tryptophan-containing alpha-subunits of the Escherichia coli tryptophan synthase. Enzymatic and urea stability properties:: J. Biol. Chem., 270; 17712-17715 (1995) (c)
29 Peracchi, A.; Mozzarelli, A.; Rosi, G.L.: Monovalent cations affect dynamic and functional properties of the tryptophan synthase alpha2beta2 complex:: Biochemistry, 34; 9459-9465 (1995) (c)
30 Choi, S.-G.; Hardmann, J.K.: Unfolding properties of tryptophan-containing alpha-subunits of the Escherichia coli tryptophan synthase:: J. Biol. Chem., 270; 28177-28182 (1995) (c)
31 Anderson, K.S.; Kim, A.Y.; Quillen, J.M.; Sayers, E.; Yang, X.-J.; Miles, E.W.: Kinetic characterization of channel impaired mutants of tryptophan synthase:: J. Biol. Chem., 270; 29936-29944 (1995) (c)
32 Zhao, G.-P.; Somerville, R.L.: Genetic and biochemical characterization of the trpB8 mutation of Escherichia coli tryptophan synthase. An amino acid switch at the sharp turn of the trypsin-sensitive hinge region diminishes substrate binding and alters solubility:: J. Biol. Chem., 267; 526-541 (1992) (c)
33 Yang, X.-J.; Ruvinov, S.B.; Miles, E..W.: Overexpression and purification of separate tryptophan synthase alpha and beta subunits from Salmonella typhimurium:: Protein Expr. Purif., 3; 347-354 (1992) (c)
34 Ki Lim, W.; Sarkar, S.K.; Hardman, J.K.: Enzymatic properties of mutant Escherichia coli tryptophan synthase alpha-subunits:: J. Biol. Chem., 266; 20205-20212 (1991) (c)
35 Blond-Elguindi, S.; Goldberg, M.E.: Kinetic characterization of early immunoreactive intermediates during the refolding of guanidine-unfolded Escherichia coli tryptophan synthase beta2 subunits:: Biochemistry, 29; 2409-2417 (1990) (c)
36 Sakaguchi, K.: The similarity of tryptophan synthetases of Anabaena variabilis and Chlorella ellipsoida with that of bacteria:: Biochim. Biophys. Acta, 220; 580-593 (1970)

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               E E5+ALL

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L2           SEL L1 1- CHEM :       9 TERMS
               SET SMARTSELECT OFF

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L4             6 S L3 (L) HERBICID?
L5             4 S L4 AND PD<19990205
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=> d ibib ab 1-4

L5 ANSWER 1 OF 4 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1999:574166 HCAPLUS
DOCUMENT NUMBER: 131:319470
TITLE: Crystallographic studies of phosphonate-based .alpha.-reaction transition-state analogues complexed to tryptophan synthase
AUTHOR(S): Sachpatzidis, Aristidis; Dealwis, Chris; Lubetsky, Jodi B.; Liang, Po-Huang; Anderson, Karen S.; Lolis, Elias
CORPORATE SOURCE: Department of Pharmacology, Yale University School of Medicine, New Haven, CT, 06520, USA
SOURCE: Biochemistry (**1999**), 38(39), 12665-12674
CODEN: BICHAW; ISSN: 0006-2960
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB In an effort to use a structure-based approach for the design of new **herbicides**, the crystal structures of complexes of **tryptophan synthase** with a series of phosphonate enzyme inhibitors were detd. at 2.3 .ANG. or higher resoln. These inhibitors were designed to mimic the transition state formed during the .alpha.-reaction of the enzyme and, as expected, have affinities much greater than that of the natural substrate indole-3-glycerol phosphate or its nonhydrolyzable analog indole propanol phosphate (IPP). These inhibitors are ortho-substituted arylthioalkylphosphonate derivs. that have an sp3-hybridized sulfur atom, designed to mimic the putative tetrahedral transition state at the C3 atom of the indole, and lack the C2 atom to allow for higher conformational flexibility. Overall, the inhibitors bind in a fashion similar to that of IPP. Glu-49 and Phe-212 are the two active site residues whose conformation changes upon inhibitor binding. A very short hydrogen bond between a phosphonate oxygen and the Ser-235 hydroxyl oxygen may be responsible for stabilization of the enzyme-inhibitor complexes. Implications for the mechanism of catalysis as well as directions for more potent inhibitors are discussed.
REFERENCE COUNT: 63 THERE ARE 63 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 2 OF 4 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1999:571274 HCAPLUS
DOCUMENT NUMBER: 131:210375
TITLE: Rational herbicide design by inhibition of tryptophan biosynthesis
AUTHOR(S): Finn, John; Langevine, Charles; Birk, Iwona; Birk, Jeff; Nickerson, Karen; Rodaway, Shirley
CORPORATE SOURCE: American Cyanamid, Agricultural Research, Princeton, NJ, 08540, USA
SOURCE: Bioorganic & Medicinal Chemistry Letters (**1999**), 9(16), 2297-2302
CODEN: BMCLE8; ISSN: 0960-894X
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Compds. designed to mimic the **tryptophan synthase** .alpha. subunit reactive intermediate were potent inhibitors of the enzyme. These compds. are **herbicidal** and the **herbicidal** mode of action was be due to disruption of tryptophan biosynthesis. The compds. are 4-(phenyl)butylphosphonates, which were prepd. and tested for **herbicidal** activity against Arabidopsis thaliana.
REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 3 OF 4 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:621327 HCAPLUS
DOCUMENT NUMBER: 129:257866
TITLE: Maize Bx1 gene for an enzyme of benzoxazinone

biosynthesis and its use in developing insect-, disease-, and herbicide-resistant plants
INVENTOR(S): Chomet, Paul; Frey, Monika; Gierl, Alfons
PATENT ASSIGNEE(S): Dekalb Genetics Corp., USA
SOURCE: PCT Int. Appl., 137 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9840505	A1	19980917	WO 1998-US5078	19980313 <--
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
AU 9864663	A1	19980929	AU 1998-64663	19980313 <--
US 6331660	B1	20011218	US 1998-39046	19980313

PRIORITY APPLN. INFO.: US 1997-40513P P 19970313
WO 1998-US5078 W 19980313

AB The maize Bx1 gene involved in benzoxazinone biosynthesis is cloned and characterized. This gene is distinct from a previously described gene for a cytochrome P 450 mapping close to the Bx1. This gene, as well as other genes involved in benzoxazinone biosynthesis, provide valuable tools for the prodn. of transgenic plants with increased levels of benzoxazinone synthesis, and therefore, resistance to insect infestation, herbicide damage and disease. The gene was cloned by transposon tagging with Mu followed by AIMS (amplification of insertion mutagenized sites). The block in benzoxazinone biosynthesis arising from mutation in Bx1 could be alleviated by supplying indole, indicating a block in indole formation. The enzyme encoded by the Bx1 gene is demonstrated to be an indole synthase. The gene is expressed in young (5 day) roots and shoots.

L5 ANSWER 4 OF 4 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1989:472994 HCAPLUS
DOCUMENT NUMBER: 111:72994
TITLE: Screening of **tryptophan synthase** inhibitors as leads of **herbicide** candidates
AUTHOR(S): Shuto, Akira; Ohgai, Mayumi; Eto, Morifusa
CORPORATE SOURCE: Dep. Agric. Chem., Kyushu Univ., Fukuoka, 812, Japan
SOURCE: Nippon Noyaku Gakkaishi (**1989**), 14(1), 69-74
CODEN: NNGADV; ISSN: 0385-1559
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Of 53 heterocyclic compds. and 10 mercaptans tested, 4-(dimethylamino)- (I), 4-(diethylamino)-, and 4-(N-methyl-N-phenylamino)pyridines and 2-mercaptobenzimidazole (II) inhibited tryptophan synthase from Escherichia coli most strongly, with median inhibitory concns. of 0.067, 0.061, 0.072, and 0.045 mM, resp. I had no marked effect on whole plants, whereas II showed considerable postemergence phytotoxicity.